duster

OPERATING INSTRUCTIONS

Part #1950

NOVAK ELECTRONICS, INC. RACING TEAM

INTRODUCING
THE DUSTER MEGAFET ESC

The Novak Duster Sport ESC™ uses the power of MEGAFET transistors and the simplicity of One-Touch Set-Up™ to create a speed control that is fast, fun, and easy to operate.

New features include Radio Priority Circuitry™ to maintain control of the radio even after the battery pack has "dumped", and digital glitch-prevention to reduce radio problems. Exclusive Solid State RVP™ offers maximum reverse voltage protection without the use of fuses.

Other features include the Novak Input Plug System™, pre-installed motor and battery connectors for easy installation, and dual-level thermal protection.

ADDITIONAL SPECIFICATIONS	
Voltage Input	4 to 10 Cells
Case Size (w/o heat sinks)	1.65" x 1.70" x 0.62"
Weight (w/o heat sinks)	1.97 oz.
On-Resistance	0.0030 Ω
Rated Current	250 amps
Braking Current	50 amps

DUSTER ACCESSORIES

COOLING FAN
An optional ESC Cooling Fan (#5645) is available for the Duster ESC to provide extra cooling for extremely heavy load applications. If the speed control gets so hot that it goes into the thermal protection mode, we recommend using the optional ESC Cooling Fan.

MOTOR CAPACITORS
To prevent radio interference, we recommend that every motor have three 0.1µF capacitors installed. Packaged with the Duster are three 0.1 µF capacitors for one motor. Extra 0.1µF capacitors are available in Novak kit #5620. See Step 4 on the back page for capacitor installation instructions.

SCHOTTKY DIODES
An internal Schottky diode is installed inside the Duster ESC. An external Schottky diode may be used with the Duster to provide a slight increase in speed control efficiency and braking smoothness. Under most conditions, an external Schottky diode is not needed.

IMPORTANT PRECAUTIONS
(ESC= ELECTRONIC SPEED CONTROL)

- Do not run the car near water! Water and electronics do not mix. Never allow water, moisture, or any foreign material onto the ESC's PC board.
- Never use more than 10 cells (12 volts total) in the main battery pack.
- Do not mix instructions. If you are building a vehicle that has a mechanical speed control, do not use the wiring diagram included with the vehicle.
- Never cut or splice the ESC input harness wires. The receiver does not need to have anything plugged into the "battery" slot, it receives power through the ESC input harness which plugs into the CHANNEL 2 slot.
- Three 0.1µF (50 V) ceramic capacitors must be properly installed on every motor.
- Never allow the heat sinks to touch each other or any exposed metal.
- Always disconnect the battery pack from the ESC when not in use.
- Never turn on the ESC before plugging it into the receiver and switching on the transmitter.
- Be careful not to touch the heat sinks when they are hot.

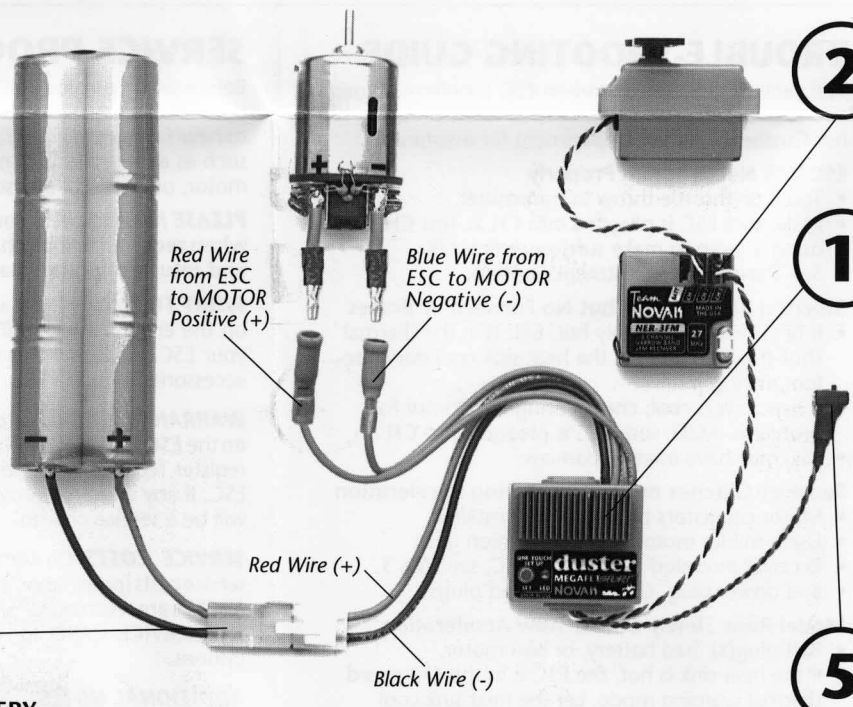
PLEASE FOLLOW ALL INSTRUCTIONS CAREFULLY

PREVENTING RADIO PROBLEMS

Radio interference can cause the speed control to rapidly switch between forward and full brakes, causing overheating of the brake transistors and possible damage to the ESC. Here are a few of the most common causes of radio problems:

- **CAPACITORS NOT INSTALLED ON MOTOR** Electric motors generate radio noise that can interfere with the receiver. To prevent radio problems, every motor should have three 0.1µF (50V) ceramic capacitors installed (see back page).
- **RECEIVER MOUNTED ON GRAPHITE OR METAL CHASSIS** Graphite and metal chassis transmit radio noise generated by the motor. To prevent radio problems, mount the receiver on the rear shock tower or away from the chassis. If the receiver is mounted on the chassis, stand it on its side with the crystal as far away from the chassis as possible.
- **RECEIVER ANTENNA CUT OR MOUNTED WRONG** If the receiver's antenna is cut, the range will be reduced. The antenna should be mounted away from the motor and power wires. Coiling the antenna wire, or keeping the entire antenna inside the body will reduce the range and increase the risk of radio problems.

DUSTER QUICK SET-UP *If necessary, refer to back page for more detailed instructions.*



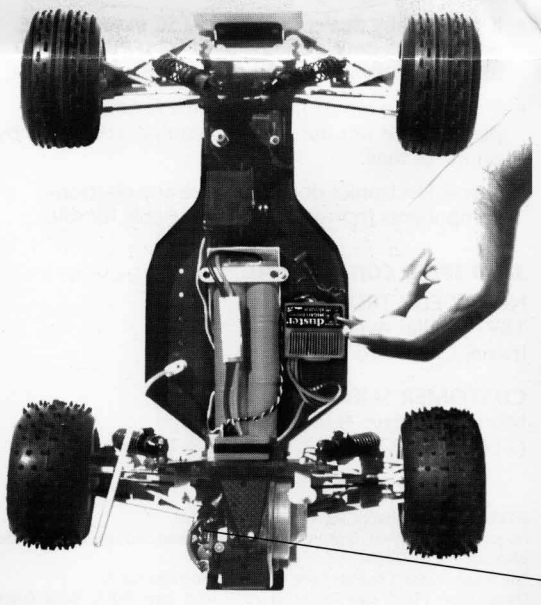
2 PLUG THE ESC AND SERVO INTO THE RECEIVER
Plug the ESC input harness into CHANNEL 2 of the receiver. Plug the steering servo into CHANNEL 1 of the receiver. Nothing should be plugged into the BATTERY slot.
Make sure the proper input plugs are installed on the ESC and servo (see Step 1 on back page).

1 INSTALL THE HEAT SINKS
Press the large heat sink onto the row of 5 transistors and the small heat sink onto the row of 3 transistors. See Step 2 on back page for complete instructions.

4 TURN ON THE TRANSMITTER
See Step 5 on back page for proper transmitter adjustments.

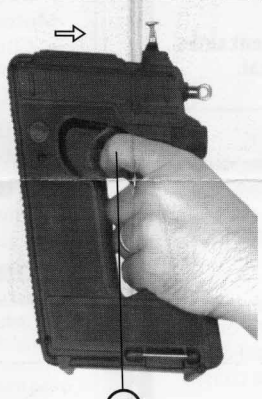
3 CONNECT THE BATTERY
Connect the Tamiya style plug from the ESC to the Tamiya style plug on a fully charged 4 to 10 cell battery pack.

5 TURN ON THE ESC



6 SET THE ESC
FOLLOW STEPS A, B, AND C

A With the transmitter throttle in the neutral position, press and hold the ESC "SET" button until the ESC light turns red, then release the "SET" button.



B Pull full throttle on the transmitter and hold until the ESC light turns solid green.

C Push and hold full brakes on the transmitter until the ESC light blinks green. Let the throttle return to neutral and wait until the ESC light turns solid red.

7 CONNECT THE MOTOR
Connect the bullet connectors on the motor, then start driving!

ONE-TOUCH SET-UP™ NOTES:

- *The motor does not run during the Set-Up sequence (even if it is connected).*
- *The ESC memorizes the settings until the Set-Up sequence is run again.*
- *If the transmitter settings are changed, run the Set-Up sequence again.*

duster
MEGAFET SPORT SPEED CONTROL

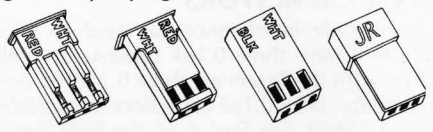
Dust the competition!

NOVAK ELECTRONICS, INC. RACING TEAM

DETAILED INSTRUCTIONS *FOLLOW STEPS 1-6*

STEP 1
CHANGING THE INPUT PLUG

Included with your ESC is the Novak Input Plug System™ to convert the ESC's input harness to be compatible with Airtronics, KO, Kyosho, and JR radios. If the factory-installed Futaba J style plug installed on the ESC is not compatible with your receiver, follow Figures 1-3 to change the input plug.



Airtronics (A) KO Kyosho (KYO) JR

FIGURE 1 With a small standard screwdriver, press on each of the three metal prongs until the wires are easy to remove. Remove wires.

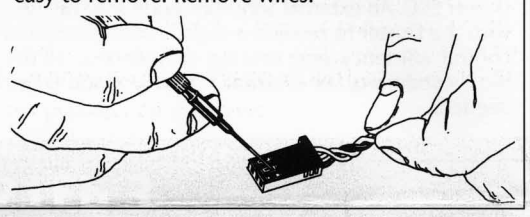


FIGURE 2 With the screwdriver, carefully lift up each of the metal locking tabs to the angle shown.

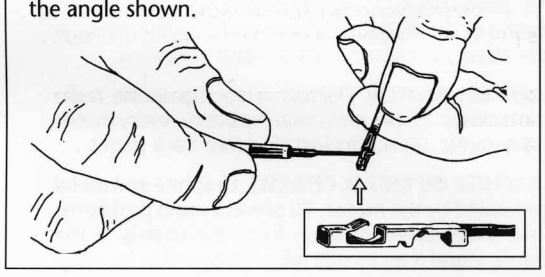
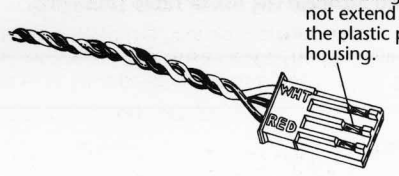


FIGURE 3 Insert each pin into the correct plug slot. Each pin should "click" into place.

(*Airtronics plug shown*)



WHT= White wire terminal (signal)
BLK= Black wire terminal (negative)
RED= Red wire terminal (positive)

CAUTION Improper installation of these wires may cause damage to the receiver, servo, and ESC.

STEP 2
HEAT SINK INSTALLATION

Refer to photos on front page

Heat sinks have been included inside the ESC box to provide cooling for the Duster ESC. The ESC will run cooler and faster when the heat sinks are installed.

1. **INSTALLING THE LARGE HEAT SINK** Place the ESC on a flat surface and press the large heat sink onto the row of 5 transistors on the left side of the ESC.
2. **INSTALLING THE SMALL HEAT SINK** Press the small heat sink onto the row of 3 transistors on the right side of the ESC.

   The heat sinks should press onto the transistors with a snug fit. If they are installed upside-down or shifted off-center, they will be too tight or too loose.

   To prevent damage to the components under the transistors, **never use a vise or pliers to force the heat sinks onto the transistors**. Do not use glue to attach the heat sinks.

   To prevent short-circuits, **never allow the heat sinks to touch each other or any exposed metal.**

STEP 3
MOUNTING INSTRUCTIONS

Refer to photos on front page

1. **MOUNTING THE SPEED CONTROL** Use the included mounting tape and install the ESC to obtain **maximum airflow through the heat sinks**. For off-road cars, the ESC should be mounted on the chassis.

   To prevent radio interference, always mount the receiver as far away from the ESC as possible.

   Mount the ON/OFF switch in a convenient place with a piece of mounting tape.
2. **MOUNTING THE RECEIVER** To minimize glitching, mount the receiver and antenna at least two inches away from the ESC, motor, servo, power wires, or any large piece of metal such as a metal chassis.

   Mount the antenna as close to the receiver as possible. If your antenna is longer than 18 inches, follow the receiver instructions for recommended antenna routing and mounting.

   If your car has a graphite chassis, and you want to mount the receiver on the chassis, mounting the receiver on edge with the crystal and antenna as far away from the chassis as possible will reduce the chances of radio interference.

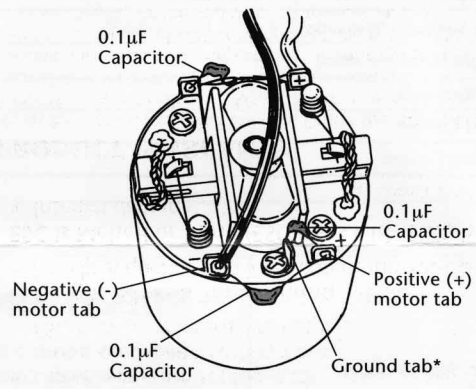
STEP 4
HOOK-UP INSTRUCTIONS

Refer to photos on front page

1. **INSTALLING MOTOR CAPACITORS**
   Motors generate radio noise which can interfere with your receiver and cause radio problems. Included with your ESC package are three 0.1µF, 50 V, non-polarized, ceramic capacitors. **These capacitors must be used at all times on every motor to help reduce the noise generated by the motor and prevent possible damage to the ESC.**

   Solder 0.1µF (50 V) capacitors between:

   - **POSITIVE** (+) motor tab & **NEGATIVE** (-) motor tab.
   - **POSITIVE** (+) motor tab & **GROUND** tab*.
   - **NEGATIVE** (-) motor tab & **GROUND** tab*.



Extra 0.1µF capacitors are available in Novak kit #5620
*Use the can of the motor if your motor does not have a motor ground tab.

2. **PLUGGING THE ESC INTO THE RECEIVER**
   After the proper input plug has been installed to match the receiver (STEP 1), plug it into CHANNEL 2 (or THROTTLE CHANNEL) of the receiver.
3. **BATTERY PACK & MOTOR CONNECTIONS**
   Connect the Tamiya plug from the ESC into the Tamiya plug on a fully charged 4 to 10 cell battery pack. Black is negative (-) and red is positive (+).

   Plug the bullet connector on the ESC's red wire (+) to motor positive. Plug the bullet connector on the ESC's blue wire (-) to motor negative.

   A wiring kit containing a Tamiya plug with wires for the battery, and bullet connectors with wires for the motor is available (Novak kit #5810).

STEP 5
TRANSMITTER ADJUSTMENTS

For proper speed control operation, the basic transmitter throttle adjustments are:

HIGH ATV, EPA—Controls the amount of throw from neutral to full throttle. **Set to middle setting.**

LOW ATV/EPA/ATL—Controls the amount of throw from neutral to full brakes. **Set to maximum setting.**

EXP or **EXPO**—Controls the linearity of the throttle channel. **Set to zero or middle setting.**

SUB TRIM—Usually used to center a servo. **Set to zero or middle setting.**

TH TRIM or COAST BRAKE—Used to control coast brakes of the ESC. **Set it to middle setting.**

MECHANICAL ADJUSTMENT—Adjusts the throw of the trigger. **Set the throw for 2/3 throttle, 1/3 brake.**

THROTTLE REVERSING SWITCH—Set it in either position. Do not change the setting after ESC Set-Up.

See ONE-TOUCH SET-UP NOTES on front page

STEP 6
SPEED CONTROL SET-UP

Before beginning this step, disconnect one of the bullet connectors on the motor. The ESC should be plugged into the receiver, a charged battery pack should be plugged into the ESC, and the transmitter adjusted.

Turn on the transmitter and then turn on the ESC.

1. With the transmitter throttle in the neutral position, press and hold the ESC "SET" button until the ESC light turns solid red.
2. Release the ESC "SET" button.
3. Pull full throttle on the transmitter and hold until the ESC light turns solid green. *NOTE: The motor will not run during Set-Up even if it is hooked up.*
4. Push full brakes on the transmitter and hold until the ESC light blinks green.
5. Let the transmitter throttle return to neutral and wait until the ESC light turns solid red.

The ESC is now set and ready to go. Plug in the bullet connector on the motor and begin driving.

If you have a problem during the Set-Up sequence, turn off the ESC switch and start again. If the transmitter settings are changed, run the Set-Up sequence again.

TROUBLE-SHOOTING GUIDE

This section describes common ESC problems, causes, and solutions. If you are unable to solve the problem, call our Customer Service Department for assistance.

ESC Will Not Program Properly
- Too little throttle throw in transmitter.
- Make sure ESC is plugged into CH 2. Test CH 2 using a servo to make sure receiver is OK.
- See Transmitter Adjustments section.

Steering Servo Works but No Forward or Brakes
- If heat sink is extremely hot, ESC is in the thermal shut-down mode. Let the heat sink cool down before driving.
- If heat sink is cool, check wiring and motor for problems. Make sure ESC is plugged into CH 2.
- ESC may have internal damage†.

Receiver Glitches or Stutters During Acceleration
- Motor capacitors broken or not installed.
- Use a milder motor or smaller pinion gear.
- Receiver mounted too close to ESC, see Step 3.
- Bad power plug, check wiring and plugs.

Model Runs Slowly or Has Slow Acceleration
- Bad plug(s), bad battery, or bad motor.
- If the heat sink is hot, the ESC is in the 1/2 speed thermal warning mode. Let the heat sink cool down before driving.
- Incorrect transmitter settings. Run Set-Up again.

Motor & Steering Servo are Dead
- Check wires, input plug, radio system, battery and motor plugs, and battery pack.
- ESC may have internal damage†.

ESC Light Blinks 5 Times during Set-Up
- Set-Up sequence was interrupted, run Set-Up again.

ESC is Melted or Burnt/ESC Runs with Switch Off
- Internal damage†.

† See SERVICE PROCEDURES.

PRODUCT WARRANTY

Novak Electronics, Inc. guarantees the Duster speed control to be free from defects in materials or workmanship for a period of 90 days from the original date of purchase (verified by a sales receipt). This warranty does not cover incorrect installation, components worn by use, damage due to using more than 12 volts (10 cells) input voltage, not using the ESC's heat sinks, short-circuiting the heat sinks, component damage from excessive force applying the heat sinks, not properly installing three 0.1µF (50V) capacitors on the motor, damage from incorrect installation of an external receiver battery pack, damage from incorrect installation of a FET servo, any splices into the input harness or switch harness, component damage from excessive force pressing the "SET" button, tampering with the electronics, allowing water, moisture, or any foreign material on the ESC's PC board, incorrect installation of an alternate input plug plastic, or allowing any exposed wire to short-circuit.

In no case shall our liability exceed product's original cost. We reserve the right to modify the provisions of this warranty without notice.

Because Novak Electronics, Inc. has no control over the installation and use of the ESC, no liability may be assumed nor will liability be accepted for any damage resulting from using this product. Every ESC is thoroughly tested and cycled before leaving our facility and is, therefore, considered operational. By the act of installing or operating this speed control, the user accepts all resulting liability.

SERVICE PROCEDURES

Before sending in your ESC for service, review the instructions and Trouble-Shooting Guide. The ESC may appear to have failed when other problems exist in the system—such as a defective transmitter, receiver, servo, battery, motor, or incorrect adjustments/installation.

PLEASE NOTE: **Speed controls that operate normally when received will be charged a minimum service fee and return shipping charges.**

WHAT TO SEND Fill out all of the information requested on the enclosed ***ESC SERVICE CARD*** and return it with your ESC. Please do not send the instructions, box, or accessories with the ESC.

WARRANTY WORK Customer MUST CLAIM WARRANTY on the ***ESC SERVICE CARD*** and include a valid, dated, cash register receipt, or a previous service invoice with the ESC. If any warranty provisions have been voided there will be a service charge.

SERVICE COSTS Customer assumes responsibility for service costs (parts, labor, and shipping/handling charges). All ESCs are returned UPS/COD CASH ONLY. Refer to the ESC SERVICE CARD for other payment and shipping options.

ADDITIONAL NOTES:
- Hobby dealers and distributors are not authorized to replace ESCs thought to be defective.
- Do not cut the input harness, switch harness, or power wires of the ESC before sending it for service. A fee will be charged for cut wires which must be replaced for testing.
- If your hobby dealer sends your ESC in for service, be sure to submit a completed ***ESC SERVICE CARD*** to your dealer and make sure it is sent with the ESC.
- To provide our customers with the fastest service possible, it is not our policy to contact customers by phone or mail.
- Novak Electronics does not make any electronic components (transistors, etc.) available for sale.

SEND SPEED CONTROLS TO:

NOVAK ELECTRONICS, INC.
18910 Teller Avenue
Irvine, CA 92715

CUSTOMER SERVICE HOURS (PST)
Monday-Friday: 8:00am-4:00pm
(714) 833-8873 • FAX (714) 833-1631

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